

# Pasteurization: Reshaping the Dairy Industry

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Junior Group Documentary

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Professor Jackie Wilke came in and discussed topic ideas. She talked about different scientists. We brainstormed many scientists but we eventually decided on Louis Pasteur and his invention of pasteurization. It's a frontier because, before pasteurization, people would get sick from drinking raw milk. After pasteurization, products were safer and not many people got sick.

We first began our research by looking up secondary sources with a Google search, which gave us some good information about our topic. Next, we started researching primary sources and got a book from our school library called *Louis Pasteur*. Later, we got an interview with a cidery that pasteurized their cider, so that information was very useful. We went to the Luther College Library and reviewed *New York Times* newspaper articles as primary sources. We conducted interviews with a yogurt company and a dairy company, who both pasteurized their products. A bill in Iowa was proposed that allows raw milk to be sold. We interviewed Sen. Schultz and asked him about the bill. We got useful information from those interviews. Then, we looked up pictures we needed and added them to our documentary.

After we decided on doing a pasteurization documentary, our computer teacher taught us some tips to use when making an iMovie. They really helped because it made the process of making the iMovie much easier and faster. The first thing we did was write our script. When writing, we looked for pictures that correlated with our script. After finishing our script, we still needed to find a couple more pictures. We placed all the photos into the iMovie and arranged them in the right order. Next, we recorded our audio using a microphone. We edited the pictures to fit with the audio. The next step was getting appropriate music. Once that was found, we added it to the iMovie which completed our documentary.

Pasteurization was invented to save the French wine industry after there was a big decline in wine exports because of spoilage, after pasteurization, French wine exports skyrocketed. By the time the process came to the American Dairy Industry, it was a success because it saved many lives, especially those of babies because before pasteurization, they drank swill milk from sick cows that lived in terrible conditions. The milk was marketed as farm fresh which caused people to drink it. Pasteurization helped American dairy businesses to increase the quality of their products and increase profits.

Pasteurization was a big invention that saved millions of lives. It was a frontier in history because it made particular dairy products much safer. Pasteurization kills diseases like typhoid fever, tuberculosis, brucellosis, and scarlet fever in everything that uses the procedure. By using pasteurization the shelf life of milk and other products was extended, which means people could have pasteurized products for longer periods of time than they could have with raw products. Pasteurization has expanded into many products like juice, eggs, vinegars, and many more.

## Works Cited

**Primary Sources****Periodicals**

Brush, E. F. "OPPOSES PASTEURIZATION.: DR. BRUSH SAYS IT DESTROYS THE NUTRITIVE VALUE of MILK." *New York Times (1857-1922)* [New York City], 24 Feb. 1907, p. 6. *ProQuest Historical Newspapers: The New York Times with Index*, proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/opposes-pasteurization/docview/96688511/se-2?accountid=27921. Accessed 5 Mar. 2023.

Dr. Edward Brush was the mayor of Mount Vernon, New York. He was one person who didn't like pasteurization because he thought it made milk less nutritious. We thought this newspaper article gave some good information about him.

By howard a. rusk, M.d. "Disease Spread by Cattle a Major Health Problem: Brucellosis, Century-Old Ailment, Fought by Pasteurization pending Control." *New York Times (1923-)* [New York City], 21 Sept. 1947, p. 24. *ProQuest Historical Newspapers: The New York Times with Index*, proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/disease-spread-cattle-major-health-problem/docview/108093464/se-2?accountid=27921. Accessed 15 Dec. 2022.

We used this newspaper because it talked about how cattle were carrying diseases in the milk that they were producing. Pasteurization killed those diseases after the milk was produced.

"DECLARE MILK PURE after 3-YEAR TESTS: SCIENTISTS WHO WORKED with DEADLY GERMS APPROVE CITY'S PASTEURIZATION RULES. END PERILOUS RESEARCH RESULTS SHOW THAT REGULATIONS of HEALTH DEPARTMENT ARE MORE than ADEQUATE. 6,574 EXPERIMENTS MADE ONE of EXPERTS, ILL with TYPHOID FEVER TWO MONTHS, CALLS IT 'JUST AN INCIDENT.'" *New York Times (1923-)*, 1925, p. 21. *ProQuest Historical Newspapers: The New York Times with Index*,  
[proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/declare-milk-pure-after-3-year-tests/docview/103523645/se-2?accountid=27921](https://www.proquest.com/historical-newspapers/declare-milk-pure-after-3-year-tests/docview/103523645/se-2?accountid=27921). Accessed 1 Apr. 2023.

In New York, tests were run to see if the current pasteurization rules were good enough. This newspaper told us about what some medical professionals thought about pasteurization.

"DECLARES RAW MILK WORSE than a PLAGUE: NATHAN STRAUS SAYS THE CITIES SHOULD PASTEURIZE IT. STATES OUGHT to PASS LAWS ENORMOUS NUMBER of LIVES MIGHT BE SAVED -- PAPER READ before INTERNATIONAL CONGRESS in PARIS." *New York Times (1857-1922)*, 22 Oct. 1905, p. 5. *ProQuest Historical Newspapers: The New York Times with Index*,  
[proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/declares-raw-milk-worse-than-plague/docview/96582959/se-2?accountid=27921](https://www.proquest.com/historical-newspapers/declares-raw-milk-worse-than-plague/docview/96582959/se-2?accountid=27921). Accessed 15 Dec. 2022.

Nathan Straus was an advocate for pasteurization. He thought that all these diseases in infants could be prevented if they used pasteurization. Straus also fought to give the poor in New York pasteurized milk.

"HOW CITY'S MILK SUPPLY IS HANDLED: HEALTH BOARD'S VIGILANCE IS CONSTANTLY NEEDED over NEARLY 2,000,000 QUARTS DAILY. PASTEURIZATION PROCESS DETAILS of THE METHOD WHICH HELPS to KEEP IT FREE of DISEASE GERMS." *New York Times (1923-)* [New York City], 7 Oct. 1923, p. 1. *ProQuest Historical Newspapers: The New York Times with Index*, proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/how-citys-milk-supply-is-handled/docview/103172456/se-2?accountid=27921. Accessed 15 Dec. 2022.

In the early 1900's, clean milk was a concern in New York City. The city had inspectors take samples of the milk and then the inspector would send them to a lab. The scientists at the lab would see if the milk had been tainted.

"MAYOR TAKES up PASTEURIZATION: NAMES SPECIAL COMMITTEE of PHYSICIANS to REPORT on CITY'S MILK SUPPLY. AN INDEPENDENT INQUIRY WANTS THOROUGH INVESTIGATION of THE MERITS of PASTEURIZATION as INSURING PURITY." *New York Times (1857-1922)* [New York City], 3 Apr. 1907, p. 7. *ProQuest Historical Newspapers: The New York Times with Index*, proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/mayor-takes-up-pasteurization/docview/96697281/se-2?accountid=27921. Accessed 15 Dec. 2022.

In 1907, the New York Mayor finally decided to look into pasteurization.

However, some people thought that just thoroughly inspecting the milk would be fine.

"MILK MUST BE PURE under a NEW ORDER: THE SANITARY CODE, after JAN. 1, WILL MAKE PASTEURIZATION COMPULSORY. EVERY QUART IS to BE GOOD DEPARTMENT of HEALTH WORKS out a SYSTEM to MAKE CITY'S SUPPLY THE SAME as CERTIFIED PRODUCT." *New York Times (1857-1922)* [New York City], 19 Dec. 1911, p. 10. *ProQuest Historical Newspapers: The New York Times with Index*, proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/milk-must-be-pure-under-new-order/docview/97213706/se-2?accountid=27921. Accessed 1 Jan. 2023.

In 1911 the board of health made a law stating that all milk must be pasteurized or inspected. Dr. Lederle met with the milk dealers in New York to talk about the dealing of pasteurized or inspected milk. This was a very useful newspaper article!

"MILK PRODUCERS to MEET: PASTEURIZATION of CERTIFIED PRODUCT to BE DISCUSSED TOMORROW." *New York Times (1923-)* [New York City], 9 June 1935, p. 31. *ProQuest Historical Newspapers: The New York Times with Index*, proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/milk-producers-meet/docview/101419406/se-2?accountid=27921. Accessed 17 Nov. 2022.

This newspaper was useful because it talked about how people met up to discuss whether or not to keep using raw milk or to try pasteurization for milk.

New York Times. "BIG TUBERCULOSIS DROP in THIS CITY: DEATH FALL of 77.9% in FIFTY YEARS AND 18.1 % in 1921 CALLED REMARKABLE ADVANCE. POINTS to ERADICATION MILK PASTEURIZATION, LESS ALCOHOLISM among POOR AND INFLUX of JEWS NAMED as CONTRIBUTING FACTORS. FACTORS TENDING to a DECREASE. a MUCH-DESIRED RESULT POSSIBLE. MASKED by INFLUENZA EPIDEMIC. PARTIAL IMMUNITY CONFERRED. BENEFIT of PASTEURIZATION." *New York Times (1857-1922)* [New York City], 8 Oct. 1922, p. 137. *ProQuest Historical Newspapers: The New York Times with Index*, proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/big-tuberculosis-drop-this-city/docview/100144686/se-2?accountid=27921. Accessed 1 Apr. 2023.

This newspaper article told us about how tuberculosis was a big problem in big cities and how pasteurization was one of the main reasons the tuberculosis death rate dropped. We also found two pictures from the newspaper and we will use those pictures in our iMovie.

---. "THE IMPURE MILK PROBLEM.: GOVERNMENT BULLETIN SAYS IDEAL VESSEL IS UNDISCOVERED -- PASTEURIZATION OFTEN INJURIOUS." *New York Times (1857-1922)* [New York City], 31 Aug. 1903, p. 6. *ProQuest Historical Newspapers: The New York Times with Index*, proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/impure-milk-problem/docview/96408667/se-2?accountid=27921. Accessed 7 Dec. 2022.

We used this newspaper because it talked about how people thought that unpasteurized products, that were stored properly, were better than pasteurized products.

"PASTEURIZATION of MILK NEEDED for CITY'S HEALTH: FACTS on THE SUBJECT

BROUGHT out at MILK CONFERENCE. WHERE INSPECTION FAILS IT IS

IMPOSSIBLE, except at ENORMOUS EXPENSE, to INSURE ABSOLUTELY

SANITARY CONDITIONS -- THE OTHER ALTERNATIVE." *New York Times*

(1857-1922) [New York City], 9 Feb. 1907, p. 5. *ProQuest Historical Newspapers: The New York Times with Index,*

proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/pasteurization-milk-needed-citys-health/docview/96703620/se-2?accountid=27921. Accessed 1 Jan. 2023.

In 1907 there was a milk conference in which they discussed pasteurization. One of the pros of pasteurization was that it would save hundreds of babies lives each year. Some people thought that they could just inspect the milk more instead of pasteurizing it. Nathan Straus ran some experiments to see which milk was best. He used children to test pasteurized milk, grocery milk, and condensed milk and pasteurized milk ended up being the best.

"REGRETS CLOSING of MILK DEPOTS: HUNDREDS of BABIES' LIVES WOULD BE

IMPERILLED, SAYS THE NEW YORK MILK COMMITTEE. CALLS STRAUS

BENEFACTOR HAS ACCOMPLISHED GREAT GOOD by HIS WORK among THE

POOR -- DENIES OPPOSING PASTEURIZATION." *New York Times (1857-1922)*

[New York City], 29 Aug. 1910, p. 7. *ProQuest Historical Newspapers: The New York Times with Index,*

proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/regrets-closing-milk-depots/docview/97011057/se-2?accountid=27921. Accessed 1 Apr. 2023.

This was a useful newspaper article about how The New York Milk Committee closed all of Nathan Straus' Milk Depots in New York. The closures forced many infants to drink unsafe milk. We also got a good picture from the newspaper and will use that picture in our documentary.

Special to THE NEW YORK TIMES. "BAN on RAW MILK HELD NEW DEAL ACT: FOE of PASTEURIZATION in JERSEY AREA SEES a 'NEW DEALER in DAIRY TRADE SOME PLACE.' after NEW LAW PASSES NOW CURB BROKER of MOUNTAIN LAKES WILL DEFY ORDINANCE WHICH IS WIDELY OPPOSED." *New York Times (1923-)* [New York City], 14 Aug. 1936, p. 5. *ProQuest Historical Newspapers: The New York Times with Index*,  
[proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/ban-on-raw-milk-held-new-deal-act/docview/101775439/se-2?accountid=27921](https://www.proquest.com/historical-newspapers/ban-on-raw-milk-held-new-deal-act/docview/101775439/se-2?accountid=27921). Accessed 5 Mar. 2023.

In 1936, the citizens of Mountain Lakes, New Jersey rallied together and did not let the health department ban the sale of raw milk in their city.

---. "NEW PLAN IS VOTED to SPUR MILK SALE: PASTEURIZATION of CERTIFIED PRODUCT to BE PERMITTED to WIDEN THE MARKET." *New York Times (1923-)* [New York City], 12 June 1935, p. 10. *ProQuest Historical Newspapers: The New York Times with Index*,  
[proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/new-plan-is-voted-spur-milk-sale/docview/101459425/se-2?accountid=27921](https://www.proquest.com/historical-newspapers/new-plan-is-voted-spur-milk-sale/docview/101459425/se-2?accountid=27921). Accessed 12 Dec. 2022.

We used this newspaper because it told us about how America was starting to use pasteurization. They had to pasteurize at least some of the product.

Special to The New York Times. "PASTEURIZATION URGED in NEW BILL: REECE'S

MEASURE PUTS TASK of INSURING PURE MILK on HEALTH BOARD. WIDER PLAN FAVORED NATHAN STRAUS ADVOCATES a LAW for THE STATE under a SPECIAL BOARD." *New York Times (1857-1922)* [New York City], 2 Feb. 1907, p. 3.

*ProQuest Historical Newspapers: The New York Times with Index,*

proxy.luther.edu/login?url=https://www.proquest.com/historical-newspapers/pasteurization-urged-new-bill/docview/96702431/se-2?accountid=27921. Accessed 1 Jan. 2023.

Nathan Straus and others wanted every milk dealer to use pasteurization. Some dealers didn't want to use pasteurization because they believed pasteurized milk still had germs. They believed this because some milk was sold as pasteurized even though it wasn't.

## Audiovisual

Anderson-Negele. Digital Chart Recorder for Pasteurization. *Pro Food World,*

www.profoodworld.com/automation/process-instrumentation/article/22275677/digital-recorder-from-andersonnegele-replaces-cumbersome-paper-charts. Accessed 3 Apr. 2023.

This is a picture of a chart recorder. They are used to make sure that the pasteurizer runs smoothly and efficiently. We liked this picture because the quality is very good and you can clearly see that it is a chart recorder.

Artizone. *Distilled White Vinegar*. 3 Nov. 2011. *Flickr,*

www.flickr.com/photos/artizone/6800262113. Accessed 29 Jan. 2023.

Distilled white vinegar is a product that uses pasteurization. We thought this was a good picture of vinegar because the quality was very clear.

Best Free Clock Png Icon - Clock Clipart Transparent Background. *PNG Key*,  
[www.pngkey.com/maxpic/u2q8q8a9t4y3t4o0/](http://www.pngkey.com/maxpic/u2q8q8a9t4y3t4o0/). Accessed 30 Jan. 2023.

This clipart clock fits our script when we talk about the amount of time needed to pasteurize products.

Bottle of Wine with Thumbs down. *Food and Wine*, Emily Saladino, 24 Feb. 2023,  
[www.foodandwine.com/drinks/3-ways-tell-if-your-wines-gone-bad](http://www.foodandwine.com/drinks/3-ways-tell-if-your-wines-gone-bad). Accessed 5 Mar. 2023.

This is a picture of a bad bottle of wine with a thumbs down next to it. We thought this picture did a great job symbolizing how wine would turn bad if it wasn't pasteurized.

"Closed Sign PNG Clipart." *PNG All*, 13 Feb. 2020,  
[www.pngall.com/closed-png/download/41333](http://www.pngall.com/closed-png/download/41333). Accessed 2 Feb. 2023.

This picture of a closing sign is meant to symbolize how the health department closed down Nathan Straus' Milk Depots in New York.

*Digital Pasteurization Thermometer. Weber Scientific*,  
[www.weberscientific.com/digital-pasteurization-thermometer](http://www.weberscientific.com/digital-pasteurization-thermometer). Accessed 2 Feb. 2023.

Pasteurization thermometers are used to make sure that the product is getting heated up to the right temperature. This is a picture of one in action.

*District Health Office, 1915. New York City*,  
[www1.nyc.gov/assets/doh/downloads/pdf/bicentennial/historical-booklet.pdf](http://www1.nyc.gov/assets/doh/downloads/pdf/bicentennial/historical-booklet.pdf). Accessed 30 Jan. 2023.

The health department in New York had a few buildings in the city. This is a picture of one of them. The health department was debating on whether or not to use pasteurization which is why we included this image.

DromeDairy. "Pasteurization Process." *Dromedary.us*, 2018,

[dromedairy.us/pages/the-benefits-of-pasteurization](https://dromedairy.us/pages/the-benefits-of-pasteurization). Accessed 13 Jan. 2023.

This image is meant to show how the process of pasteurization works. We will use this in our iMovie to help explain what pasteurization is.

*Equipment Used for Pasteur's Studies of Beer Fermentation. Pasteur Brewing,*

[www.pasteurbrewing.com/louis-pasteur-image-galleries/pasteurs-equipment/](https://www.pasteurbrewing.com/louis-pasteur-image-galleries/pasteurs-equipment/). Accessed 1 Feb. 2023.

When Louis Pasteur was studying the science of fermentation, he used equipment like microscopes. We really liked this sketch of his microscope because you can see all of the parts of the microscope.

"First Milk Pasteurization Marker." *HMdb.org*, [www.hmdb.org/m.asp?m=136096](https://www.hmdb.org/m.asp?m=136096). Accessed 30 Jan. 2023.

We got two good pictures of the first building that used pasteurization for milk.

We used this picture when talking about the first milk pasteurization process.

*Flow Pasteurizer. C.van's Riet*, [www.dairy-equipment.com/dairy-technology/flow-pasteurizer](https://www.dairy-equipment.com/dairy-technology/flow-pasteurizer).

Accessed 2 Feb. 2023.

Flow pasteurization is one type of pasteurization. We really liked this picture of a flow pasteurizer because you could see almost every single part of the pasteurizer.

*Garbellotto Oak Vats. The Vinter Vault*, [www.thevintnervault.com/tanks-fermenters-oak-vats/](https://www.thevintnervault.com/tanks-fermenters-oak-vats/).

Accessed 1 Feb. 2023.

Wine vats are used to hold many gallons of wine. We liked this picture of wine vats because many vats are depicted in the picture and the quality is very good.

Glass and Cup of Milk. *Undeniably Dairy*, 18 Apr. 2022,

[www.usdairy.com/news-articles/whole-milk-nutrition-facts](http://www.usdairy.com/news-articles/whole-milk-nutrition-facts). Accessed 29 Jan. 2023.

This picture of pasteurized milk will be used to show what pasteurized milk looks like.

Glass of Milk Being Poured. *Medical News Today*, [www.medicalnewstoday.com/articles/296564](http://www.medicalnewstoday.com/articles/296564).

Accessed 2 Feb. 2023.

This picture of a glass of milk will be used when we talk about how milk is a product that uses pasteurization.

Grade "A" Pasteurized Milk Ordinance. 2009. *Kansas Department of Agriculture*,

[agriculture.ks.gov/docs/default-source/rc-dairy/grade-a-pasteurized-milk-ordinance.pdf?s\\_fvrnsn=fbe19d\\_2](http://agriculture.ks.gov/docs/default-source/rc-dairy/grade-a-pasteurized-milk-ordinance.pdf?s_fvrnsn=fbe19d_2). Accessed 29 Jan. 2023.

The Grade "A" Pasteurized Milk Ordinance or PMO is a book which contains all the laws relating to pasteurization. This is a picture of the PMO book cover from 2009.

*Great Value, 1% Low Fat Milk. Open Food Facts*,

[world.openfoodfacts.org/product/0078742351889/great-value-1-low-fat-milk](http://world.openfoodfacts.org/product/0078742351889/great-value-1-low-fat-milk). Accessed 30 Jan. 2023.

When pasteurization was first brought to the U.S., some people thought that the process would make milk less nutritious. We will use this nutrition label to show nutrition.

Kerber, Christian. In the riverside town of Abrois, travelers can try local wines and dine on michelin-starred cuisine. *National Geographic*, 23 Dec. 2019, [www.nationalgeographic.com/travel/article/why-jura-will-be-your-next-travel-obsession](http://www.nationalgeographic.com/travel/article/why-jura-will-be-your-next-travel-obsession). Accessed 27 Jan. 2023.

This is a picture of a French town called Abrois from above. It is where Louis Pasteur grew up and where he developed pasteurization.

Klotz, Jerrye, and Roy Klotz. *Mountain Lakes Historic District*. 30 Nov. 2007. *Wikipedia*, [en.wikipedia.org/wiki/Mountain\\_Lakes,\\_New\\_Jersey](http://en.wikipedia.org/wiki/Mountain_Lakes,_New_Jersey). Accessed 27 Jan. 2023.

Mountain Lakes, New Jersey was a town that opposed pasteurization. When the health department tried to ban raw milk sales, the citizens rallied together and stopped it from happening. We will use this picture to symbolize Mountain Lakes.

"Louis Dominique Bigo." *Geneanet*, [gw.geneanet.org/ricou83?lang=en&n=bigo&oc=0&p=louis+dominique](http://gw.geneanet.org/ricou83?lang=en&n=bigo&oc=0&p=louis+dominique). Accessed 29 Jan. 2023.

Louis Bigo was the person who asked Louis Pasteur to create pasteurization. His son was the person who suggested that he talk to Louis Pasteur. This is a picture of Bigo's son.

*Louis Pasteur's House. Terre De Louis Pasteur*, [www.terredelouispasteur.fr/en/louis-pasteurs-house/](http://www.terredelouispasteur.fr/en/louis-pasteurs-house/). Accessed 29 Jan. 2023.

Louis Pasteur used this building in Arbois as his lab when developing pasteurization. He also lived in it.

Many Bottles of Pasteurized Milk. *Dairy Reporter*, 30 May 2017, Joseph James Whitworth. Accessed 29 Jan. 2023.

This picture of many bottles of milk will be used to represent how milk is a product that is pasteurized.

Mehr, Mary. *Louis Pasteur*. 2020. *Artmajeur*,

[www.artmajeur.com/marym-dessinrealiste/en/artworks/13222583/louis-pasteur](http://www.artmajeur.com/marym-dessinrealiste/en/artworks/13222583/louis-pasteur). Accessed 13 Feb. 2023.

This is a sketch of Louis Pasteur sitting in a chair. He is the creator of pasteurization.

*The Milking and Pasteurization Process*. 2014. *YouTube*, High Observations,

[www.youtube.com/watch?v=ad7RChNWjLo](http://www.youtube.com/watch?v=ad7RChNWjLo). Accessed 4 Apr. 2023.

We chose this video of pasteurization because the milk bubbling makes it clear that the milk is being heated. The quality is also pretty good.

Money from the First National Bank of Watervliet. *Antique Money*,

[antiquemoney.com/national-bank-notes/new-mexico/old-money-from-the-first-national-bank-of-carlsbad-5487/](http://antiquemoney.com/national-bank-notes/new-mexico/old-money-from-the-first-national-bank-of-carlsbad-5487/). Accessed 10 May 2023.

This image of money will be used in our documentary to represent how businesses made more money because of pasteurization. We liked this specific image of money because it was from New York and New York was very talked about in our documentary.

*Mycoderma Aceti in Vinegar*. 23 Oct. 2014. *Wikimedia Commons*,

[commons.wikimedia.org/wiki/File:Mycoderma\\_aceti\\_in\\_vinegar.\\_Wellcome\\_M0008824.jpg](http://commons.wikimedia.org/wiki/File:Mycoderma_aceti_in_vinegar._Wellcome_M0008824.jpg). Accessed 13 Feb. 2023.

*Mycoderma aceti* is a germ that sours wine. This is a picture of the germ in some vinegar under a microscope.

"[Nathan Straus, head-and-shoulders portrait, facing left]." *Library of Congress*,  
[www.loc.gov/item/96506062/](http://www.loc.gov/item/96506062/). Accessed 2 Feb. 2023.

Nathan Straus really wanted people to use pasteurization. He opened up milk  
 depots around New York and donated pasteurization plants around the U.S.

National Bureau of Economic Research. "Wine Production for France." *FRED Economic Data*,  
[fred.stlouisfed.org/series/A01027FRA413NNBR](http://fred.stlouisfed.org/series/A01027FRA413NNBR). Accessed 1 Apr. 2023.

This is a picture of French wine production in the mid 1800's and 1900's. It was  
 down due to wine souring and pasteurization made the production go up.

Novak, Petr. *Everyone's Dream Wine Cellar? Tom's Wine Line*, 23 Feb. 2010,  
[ubriaco.wordpress.com/2010/02/23/out-of-the-cellar/](http://ubriaco.wordpress.com/2010/02/23/out-of-the-cellar/). Accessed 30 Jan. 2023.

When Louis Pasteur was creating pasteurization, he needed to take samples of  
 wine from wine cellars. We will use this picture when we talk about that.

Petit, Pierre Lamy. "Louis Pasteur by Pierre Lamy Petit." *PICRYL Public Domain Image*,  
 GetArchive,  
[garystockbridge617.getarchive.net/amp/media/louis-pasteur-by-pierre-lamy-petit-cc1276](http://garystockbridge617.getarchive.net/amp/media/louis-pasteur-by-pierre-lamy-petit-cc1276).  
 Accessed 14 Dec. 2022.

This is a picture of Louis Pasteur. He is known as the father of microbiology and  
 created pasteurization and some other things.

Picture of French Wines. *somMailier*, [sommelier.com/read-a-french-wine-label/](http://sommelier.com/read-a-french-wine-label/). Accessed 28  
 Jan. 2023.

This is a picture of some different French wines. Louis Pasteur actually created  
 the process of pasteurization to save French wines.

*The Royal Children's Hospital: 150 years of caring. The University of Melbourne,*

[museums.mdhs.unimelb.edu.au/exhibitions/online-exhibitions/the-royal-childrens-hospital-150-years-of-caring](https://museums.mdhs.unimelb.edu.au/exhibitions/online-exhibitions/the-royal-childrens-hospital-150-years-of-caring). Accessed 1 Apr. 2023.

Lots of kids were hospitalized before pasteurization because milk would be germ filled. We will use this picture to represent all the sick children

Series: National Dairy Week Publicity. Oct. 1937. *Ann Arbor District Library,*

[aadl.org/N020\\_0267\\_002](https://aadl.org/N020_0267_002). Accessed 9 Mar. 2023.

This picture of an early pasteurizer is meant to show how the process of pasteurization has evolved since its creation.

Sick Kids in a Hospital in Canada. *The Toronto Star*, 3 Feb. 2017,

[www.thestar.com/yourtoronto/once-upon-a-city-archives/2017/02/03/once-upon-a-city-how-sickkids-grew-from-its-austere-origins.html](https://www.thestar.com/yourtoronto/once-upon-a-city-archives/2017/02/03/once-upon-a-city-how-sickkids-grew-from-its-austere-origins.html). Accessed 1 Apr. 2023.

Before pasteurization, lots of children would get sick from diseased dairy products. We will use this picture to show some children who got sick.

"A Tetra Pak Ultra Pasteurization Line." 30 May 2008. *Wikipedia,*

[commons.wikimedia.org/wiki/File:Tetra\\_Pak\\_processing\\_equipment\\_Tetra\\_Lactenso\\_Aseptics.jpg](https://commons.wikimedia.org/wiki/File:Tetra_Pak_processing_equipment_Tetra_Lactenso_Aseptics.jpg). Accessed 5 Mar. 2023.

This is a picture of an ultra high temperature pasteurizer. It's a very common type of pasteurization. We will use this when we talk about the types of pasteurization.

"Thermometer Clip Art 3." *ClipartX*, [clipartix.com/thermometer-clip-art-image-1172/](https://clipartix.com/thermometer-clip-art-image-1172/). Accessed 30 Jan. 2023.

This thermometer will be used when we talk about the temperature of each type of pasteurization.

Two Open Hands. *BBC Science Focus*,

[www.sciencefocus.com/the-human-body/why-do-we-have-lines-on-the-palms-of-our-hands/](http://www.sciencefocus.com/the-human-body/why-do-we-have-lines-on-the-palms-of-our-hands/). Accessed 29 Jan. 2023.

When grapes were being picked to make wine, sometimes germs from the workers hands would get into the grapes contaminating the wine. We will use this picture to represent the vineyard workers' hands.

*Types of Pasteurization. Zwirner Equipment*, 27 Sept. 2016,

[www.zwirnerequipment.com/blog/methods-of-pasteurization/](http://www.zwirnerequipment.com/blog/methods-of-pasteurization/). Accessed 2 Feb. 2023.

Vat pasteurization was the original type of pasteurization. We needed an image of a vat pasteurizer. We chose this one because the picture shows the whole machine.

"UHT Pasteurizer." 10 July 2020. *PMG*, [www.pmg.engineering/uht-pasteurization/](http://www.pmg.engineering/uht-pasteurization/). Accessed 26 Jan. 2023.

We found a good picture of a ultra high temperature pasteurizer. The process heats up the product to a whopping 280 degrees Fahrenheit, for two seconds.

"UHT Treatment Machines for Milk and Other Liquid Foods." *CFT*,

[www.cft-group.com/uht-treatment-machines-for-milk-and-liquid-foods/](http://www.cft-group.com/uht-treatment-machines-for-milk-and-liquid-foods/). Accessed 1 Feb. 2023.

Ultra high temperature pasteurization is mostly used for milk, but is also used for yogurt, cream, soy milk, fruit juices, wine, soups, honey, and stews. This is one out of three pasteurizers that we talk about in our project.

Ullmann, Agnes. "Louis Pasteur." 23 Dec. 2022. *Encyclopedia Britannica*,

[www.britannica.com/biography/Louis-Pasteur](http://www.britannica.com/biography/Louis-Pasteur). Accessed 5 Jan. 2023.

This is a picture of Louis Pasteur. We will use this when referencing how Louis Pasteur created pasteurization.

"Understanding Baby Behavior and Awareness." *RaisingChildren.Net.AU*, [raisingchildren.net.au/babies/behaviour/understanding-behaviour/baby-behaviour-awareness](https://raisingchildren.net.au/babies/behaviour/understanding-behaviour/baby-behaviour-awareness). Accessed 2 Feb. 2023.

When people were debating over pasteurization, the New York Board of Health tested pasteurized milk on babies. We will use this when referencing those tests.

"Vat Pasteurization –Working." *PMG*, 19 Apr. 2019, [www.pmg.engineering/vat-pasteurization/](http://www.pmg.engineering/vat-pasteurization/). Accessed 31 Jan. 2023.

A vat pasteurizer is mainly used to pasteurize yogurt, milk, and cheese. We also found a good picture of a vat pasteurizer

"Vat Pasteurizer." *C. Vant Riet*, [www.dairy-equipment.com/dairy-technology/vat-pasteurizer](http://www.dairy-equipment.com/dairy-technology/vat-pasteurizer). Accessed 23 Jan. 2023.

Vat pasteurization is a method of pasteurization. This is a picture of a vat pasteurizer.

Vineyard Workers at Penfolds Circa Early 1900s / Photo Courtesy of Penfolds. *Wine Enthusiast*, [www.winemag.com/2019/02/15/a-tour-of-australias-historic-wineries/](http://www.winemag.com/2019/02/15/a-tour-of-australias-historic-wineries/). Accessed 2 Feb. 2023.

When Louis Pasteur told the vineyard workers about pasteurization, they didn't think it'd work because they thought that heat would screw up their wine. We will use these two pictures to symbolize the vineyard workers.

Wendle, Abby. Raw Milk Being Poured. *NPR*, 20 Feb. 2015,

[www.npr.org/sections/thesalt/2015/02/20/387558373/why-some-states-want-to-legalize-raw-milk-sales](http://www.npr.org/sections/thesalt/2015/02/20/387558373/why-some-states-want-to-legalize-raw-milk-sales). Accessed 29 Jan. 2023.

Raw milk is milk that isn't pasteurized. We will use this picture to show what raw milk looks like.

Whitehead, T. A. *Studio Portrait of a One Year Old Baby, Ipswich, 1913*. 28 June 1912. *State Library of Queensland*, [collections.slg.qld.gov.au/viewer/IE174485](http://collections.slg.qld.gov.au/viewer/IE174485). Accessed 29 Mar. 2023.

When the New York Board of Health was seeing if pasteurization was effective they ran tests on babies where half of them would drink raw milk and the others would drink pasteurized milk. We will use this image when talking about those tests.

## **Web sites, e-sources**

*My Jewish Learning*. 20 Dec. 2021,

[www.myjewishlearning.com/the-nosher/you-can-thank-this-jewish-american-philanthropist-for-pasteurized-milk/](http://www.myjewishlearning.com/the-nosher/you-can-thank-this-jewish-american-philanthropist-for-pasteurized-milk/). Accessed 27 Jan. 2023.

This provided information about Nathan Straus. It told us that he set up small pasteurization plants and was a representative for pasteurized products.

UnlockFood.ca, editor. "Facts on Pasteurization." *UnlockFood.ca*, 31 Oct. 2018,

[www.unlockfood.ca/en/Articles/Food-technology/Facts-on-Pasteurization.aspx](http://www.unlockfood.ca/en/Articles/Food-technology/Facts-on-Pasteurization.aspx). Accessed 14 Nov. 2022.

We used this site because it talked about how people with weaker immune systems have a higher chance of getting sick from unpasteurized products. We also used this site because it talked about how you didn't need to pasteurize ciders and juices, but you should. If you had them pasteurized, it was a way lower chance of getting diseases from them.

## Interviews

Howard, Bob. Interview. 13 Jan. 2023.

We did an interview with personnel of Country View Dairy. Bob Howard told us some useful information on how they use their vat pasteurizer to make yogurt. They also pasteurize milk and ice cream mixes.

Naber, Natalie. Interview. Conducted by Kalin Harman and Rex LaFrentz, 11 Nov. 2022.

This gave us some info about vat pasteurization and gave us the chance to get some pictures. It also told us a little bit about HTST pasteurization.

Schultz, Jason. Videoconference interview with the author. 27 Apr. 2023.

We interviewed Iowa senator Jason Schultz about the raw milk bill that is in the process of being passed in Iowa. He told us about how he just wants people to have the freedom to choose what they want and that he's not against pasteurization as a whole.

Weighner, Tom. Interview. 1 Dec. 2022.

Mr. Weighner told us a lot about HTST pasteurization and how they use the same machine for every dairy product. The machine heats up the product to 161 degrees Fahrenheit and uses cold water to cool it.

## Secondary Sources

### Non Periodicals

Tiner, John Hudson, and Michael L. Denman. *Louis Pasteur: Founder of Modern Medicine*.

Milford, Mott Media, 1990. Louis Pasteur: Founder of Modern Medicine 1.

This was a very useful source. We found info on Pasteur's early life before teaching. It also told us why Pasteur decided to create pasteurization in the first place.

### Audiovisual

*Abraham and Straus, Brooklyn, New York. Pinterest,*

[www.pinterest.com/pin/143059725634222067/](https://www.pinterest.com/pin/143059725634222067/). Accessed 28 Jan. 2023.

This is a picture of an Abraham and Straus Department Store. One of the owners was Nathan Straus who was a big advocate for pasteurization in New York. We found this image on a secondary source, but it is a primary picture of the store.

"Beaujolais Nouveau." *Encyclopedia Britannica*, [www.britannica.com/topic/Beaujolais-wine](https://www.britannica.com/topic/Beaujolais-wine).

Accessed 13 Feb. 2023.

Wine was one of the first products that was commonly pasteurized. We liked this picture because it depicts two different bottles of wine. We found this image on a secondary source, but it is a primary image.

"Beer." *Encyclopedia Britannica*, [www.britannica.com/topic/beer#/media/1/58378/107660](https://www.britannica.com/topic/beer#/media/1/58378/107660).

Accessed 28 Jan. 2023.

Beer is one product that is regularly pasteurized. This picture was very good because it is clear and fit our script. We found this image on a secondary source, but it is a primary image.

Black and White Drawing of Louis Pasteur Working in His Lab. *Facts.Net*, Facts Chief, 25 May 2022, [facts.net/louis-pasteur-facts/](https://facts.net/louis-pasteur-facts/). Accessed 13 Feb. 2023.

We really like this drawing of Louis Pasteur because in our documentary we didn't have many illustrations. Adding a drawing really added quality to our documentary. We found this image on a secondary source but it's a primary image.

"Blair Hall on the Campus of Princeton University, Princeton, N.J." *Encyclopedia Britannica*, [www.britannica.com/topic/Princeton-University#/media/1/476773/92552](https://www.britannica.com/topic/Princeton-University#/media/1/476773/92552). Accessed 28 Jan. 2023.

We needed a picture of a building at Princeton. We thought Blair Hall was a great building to use. Its design is very interesting and we thought it was an overall beautiful building. We found this image on a secondary source, but it is a primary image.

"Boiling." *Encyclopedia Britannica*, [www.britannica.com/topic/boiling-cooking#/media/1/71787/121437](https://www.britannica.com/topic/boiling-cooking#/media/1/71787/121437). Accessed 29 Jan. 2023.

Pasteurization is a procedure that uses heat. We thought that this pot of boiling water did a great job symbolizing heat. We found this image on a secondary source, but it is a primary image.

Breton, Louis Le. *The Jean Bart*. *Wikipedia*,

[en.wikipedia.org/wiki/French\\_ship\\_Jean\\_Bart\\_%281852%29](https://en.wikipedia.org/wiki/French_ship_Jean_Bart_%281852%29). Accessed 28 Jan. 2023.

This is a picture of the French ship called the Jean Bart. It was used to hold wine kegs as a part of an experiment to see if the wine would sour on the ship. We found this image on a secondary source, but it is a primary image.

Britannica, The Editors of Encyclopaedia. "Nathan Straus." *Encyclopedia Britannica*, 7 Jan.

2023, <https://www.britannica.com/biography/Nathan-Straus>. Accessed 11 January 2023.

This is a picture of Nathan Straus. He was a big advocate on trying to get people to use pasteurized products. We found this image on a secondary source, but it is a primary image.

"Brown Eggs." *Encyclopedia Britannica*,

[www.britannica.com/topic/egg-food#/media/1/180194/160981](https://www.britannica.com/topic/egg-food#/media/1/180194/160981). Accessed 29 Jan. 2023.

Eggs are a product that is required to be pasteurized by the FDA. We chose this picture because we liked the angle it was taken from and we liked that there were many eggs depicted in the picture. We found this image on a secondary source, but it is a primary image.

Customer Buying Milk from Milkman. *The Better Milk*, 21 Apr. 2022,

[www.thebettermilk.com/blogs/news/the-traditional-history-of-the-milkman](https://www.thebettermilk.com/blogs/news/the-traditional-history-of-the-milkman). Accessed 3 Mar. 2023.

In the mid 1900's, when pasteurization was made law, people started buying more milk because they knew that it was safe. This picture depicts a woman buying milk in the 1900's. This picture was found on a secondary source, but is a primary image.

"#DC232 - Leonberg Dairy Milk Bottle Cap from Rochester, PA - Pictures Cow." *DON and CHRIS' OLD STUFF WHOLESale VINTAGE ANTIQUES and COLLECTIBLES*, [www.oldstuffonly.com/items/1960s/cliffco-wwidrinazppieoleon-detail.htm](http://www.oldstuffonly.com/items/1960s/cliffco-wwidrinazppieoleon-detail.htm). Accessed 10 May 2023.

This is a picture of a vintage Leonberg Dairy bottle cap. We will use this picture when we talk about the milk that they use for tests that they do on babies.

Desvarreux, Raymond. *General Dampierre Leading the French Troops at the Battle of Jemappes*. *Wikipedia*, [en.wikipedia.org/wiki/French\\_Revolutionary\\_Army](https://en.wikipedia.org/wiki/French_Revolutionary_Army). Accessed 13 Feb. 2023.

When pasteurization was created, some people didn't believe that it worked. So Louis Pasteur asked the French military for a boat to use for a test. This picture symbolizes the French military. I found this on a secondary source but it's a primary image.

Early 1900's Formula Advertisement. *Aims*, Marta Busquets, 2018, [www.aims.org.uk/journal/item/nestle](http://www.aims.org.uk/journal/item/nestle). Accessed 3 Mar. 2023.

When the health department closed down Nathan Straus' Milk Depots, there was lots of milk that was still in the depots that babies could've drunk. This is a picture of special milk meant for babies; otherwise known as formula. We found this image on a secondary source, but it is a primary image.

Euler, Heinrich Gustav. "Napoleon III." *Encyclopedia Britannica*, 6 Jan. 2023, <https://www.britannica.com/biography/Napoleon-III-emperor-of-France>. Accessed 13 January 2023.

This is a picture of Napoleon Bonaparte III. He is the person who commissioned Louis Pasteur to create pasteurization. We found this image on a secondary source, but it is a primary image.

"France." *Encyclopedia Britannica*, [www.britannica.com/place/France#/media/1/215768/208497](http://www.britannica.com/place/France#/media/1/215768/208497).

Accessed 28 Jan. 2023.

France was where the process of pasteurization was developed and this is a picture of the country on a map. I found this image on a secondary source, but it is a primary image.

"George B. McClellan Jr." *Wikipedia*, [en.wikipedia.org/wiki/George\\_B.\\_McClellan\\_Jr](https://en.wikipedia.org/wiki/George_B._McClellan_Jr). Accessed

28 Jan. 2023.

Mayor McClellan was the Mayor of New York who made pasteurization law.

This is a picture of him. We found this picture on a secondary source, but it is a primary image.

"Grapes." *Encyclopedia Britannica*,

[www.britannica.com/summary/grape#/media/1/241944/252869](http://www.britannica.com/summary/grape#/media/1/241944/252869). Accessed 29 Jan. 2023.

This is a picture of a grape vine growing on a tree. We will use this in our iMovie when we talk about how grape trees contaminated wine. I found this image on a secondary source, but it is a primary image.

"Hard Cider." *Encyclopedia Britannica*,

<https://www.britannica.com/topic/cider#/media/1/117682/259559>. Accessed 28 Jan. 2023.

This is a picture of alcoholic cider. I really liked this picture and thought the apple was a nice touch. I found this image on a secondary source, but it is a primary image.

"Holstein-Friesian Cow." *Encyclopedia Britannica*,

[www.britannica.com/topic/dairying#/media/1/149965/95673](http://www.britannica.com/topic/dairying#/media/1/149965/95673). Accessed 29 Jan. 2023.

Holstein Friesian cows are one type of cow that produces milk. This is a picture of one standing outside. I found this image on a secondary source, but it is a primary image.

"Home Canning." *Encyclopedia Britannica*,

[www.britannica.com/topic/canning-food-processing#/media/1/92715/117267](http://www.britannica.com/topic/canning-food-processing#/media/1/92715/117267). Accessed 27 Jan. 2023.

Produce is a product that can be pasteurized which is why we got this image. I chose this picture because it shows a variety of produce. I found this image on a secondary source, but it is a primary image.

How Pasteurization Keeps Pathogens at Bay. *Food Safety News*, Lydia Zuraw, 20 Jan. 2014,

[www.foodsafetynews.com/2014/01/pasteurization-how-heat-keeps-pathogens-at-bay/](http://www.foodsafetynews.com/2014/01/pasteurization-how-heat-keeps-pathogens-at-bay/). Accessed 2 Feb. 2023.

This is a picture of a vat pasteurization machine. We like how this picture shows the whole machine instead of just a part of it. We also like the angle the picture was taken from. We found this picture on a secondary source, but it is a primary image.

*HTST Pasteurizer at a Quebec Cheese Factory*. *Cheese and Toast*, 27 Aug. 2013,

[cheeseandtoast.files.wordpress.com/2013/08/htst-pasteurizer-at-a-quebec-cheese-factory.jpg](http://cheeseandtoast.files.wordpress.com/2013/08/htst-pasteurizer-at-a-quebec-cheese-factory.jpg). Accessed 2 Feb. 2023.

HTST pasteurization is one of the most common types of pasteurization and this is a picture of a HTST pasteurizer in action. We found this image on a secondary source, but it is a primary image.

Janina. A Pasteurization Machine in Queensland, Australia, in 1953. *The History of Raw Milk and Pasteurization*, Janina, 6 May 2014, [foodpolicyforthought.com/2014/05/06/the-history-of-raw-milk-and-pasteurization/](http://foodpolicyforthought.com/2014/05/06/the-history-of-raw-milk-and-pasteurization/). Accessed 6 Jan. 2023.

This is a photo of people working a pasteurizer in Queensland, Australia, in the 1900's. We found this picture on a secondary source, but it's a primary image.

"La Sybille." *Game-Labs Forum*, [forum.game-labs.net/topic/6475-sibylle-venus-class-french-frigate-with-plans/](http://forum.game-labs.net/topic/6475-sibylle-venus-class-french-frigate-with-plans/). Accessed 2 Feb. 2023.

This is a picture of the French ship La Sibylle. It was also used to hold wine kegs as an experiment. We found this on a secondary source, but it's a primary image.

"Louis Bigo." *Wikimedia Commons*, 16 Sept. 2020, [commons.wikimedia.org/wiki/File:Louis\\_Bigo.jpg#filehistory](https://commons.wikimedia.org/wiki/File:Louis_Bigo.jpg#filehistory). Accessed 18 Jan. 2023.

I found a good picture of Louis Dominique Bigo. He asked Louis Pasteur to solve the problem of his beetroot wine going sour. We found this on a secondary source, but it is a primary image.

*Louis Pasteur*. *Comic Vine*, GameSpot, [comicvine.gamespot.com/louis-pasteur/4005-15878/](http://comicvine.gamespot.com/louis-pasteur/4005-15878/). Accessed 1 Feb. 2023.

This is a picture of Louis Pasteur, the creator of pasteurization. We found this picture on a secondary source, but it's a primary image.

*Louis Pasteur. DK Find Out*, [www.dkfindout.com/uk/science/famous-scientists/louis-pasteur/](http://www.dkfindout.com/uk/science/famous-scientists/louis-pasteur/).

Accessed 1 Feb. 2023.

This is a picture of Louis Pasteur. He is known as the Father of Microbiology and developed pasteurization. We found this picture on a secondary source, but it's a primary image.

"Louis Pasteur." *Encyclopedia Britannica*,

[www.britannica.com/biography/Louis-Pasteur#/media/1/445964/122445](http://www.britannica.com/biography/Louis-Pasteur#/media/1/445964/122445). Accessed 27 Jan. 2023.

This is a picture of Louis Pasteur, the creator of pasteurization. I found this image on a secondary source, but it is a primary image.

"Louis Pasteur and Fermentation." *Encyclopedia Britannica*,

[www.britannica.com/biography/Louis-Pasteur#/media/1/445964/122442](http://www.britannica.com/biography/Louis-Pasteur#/media/1/445964/122442). Accessed 11 Jan. 2023.

This is a picture of Louis Pasteur working with fermentation. We will use this when we talk about how Pasteur created pasteurization. I found this image on a secondary source, but it is a primary image.

Louis Pasteur, Inventor of "Pasteurization", Silences Haters. *Couraj*,

[couraj.com/blogs/history/16960339-louis-pasteur-inventor-of-pasteurization-silences-haters](http://couraj.com/blogs/history/16960339-louis-pasteur-inventor-of-pasteurization-silences-haters). Accessed 1 Feb. 2023.

This is a picture of the creator of pasteurization; Louis Pasteur. We found this picture on a secondary source, but it's a primary image.

"Louis Pasteur Public Domain Image." *Outbreak News Today*, 2 July 2015, [outbreaknewstoday.com/legends-of-microbiology-and-infectious-diseases-louis-pasteur-63400/](https://outbreaknewstoday.com/legends-of-microbiology-and-infectious-diseases-louis-pasteur-63400/). Accessed 2 Feb. 2023.

This is a picture of Louis Pasteur, the inventor of pasteurization. We found this picture on a secondary source, but it's a primary image.

"Louis Pasteur's Compound Microscope." *Science Museum Group*, [collection.sciencemuseumgroup.org.uk/objects/co505718/louis-pasteurs-compound-microscope-compound-microscope](https://collection.sciencemuseumgroup.org.uk/objects/co505718/louis-pasteurs-compound-microscope-compound-microscope). Accessed 29 Jan. 2023.

We found a good picture of Louis Pasteur's microscope. He used the microscope to observe many bacterias, including mycoderma aceti. We found this on a secondary source, but it is a primary image.

"Macy's." *Encyclopedia Britannica*, [www.britannica.com/topic/Macys#/media/1/355535/113791](https://www.britannica.com/topic/Macys#/media/1/355535/113791).

Nathan Straus was a co-owner of Macy's. I chose this picture because the sign on the side of the building makes it so that you can tell it's a Macy's. We will use this when talking about Nathan Straus. We found this on a secondary source, but it is a primary image.

"Madeira." *Encyclopedia Britannica*, [www.britannica.com/topic/Madeira-wine#/media/1/355697/129066](https://www.britannica.com/topic/Madeira-wine#/media/1/355697/129066). Accessed 2 Feb. 2023.

Wine was the first product to be pasteurized. We will use this when talking about how pasteurization was created for wine. We found this on a secondary source, but it is a primary image.

*Mayor Edward F. Brush, Early Twentieth Century. Blogger, 14 Mar. 2018,*

[www.throughthehourglass.com/2018/03/too-late-for-kumyss.html](http://www.throughthehourglass.com/2018/03/too-late-for-kumyss.html). Accessed 5 Mar. 2023.

This is a picture of Dr. Edward Brush. He was the mayor of Mount Vernon, New York. I found this picture on a secondary source, but it's a primary image.

"Milk." *Encyclopedia Britannica,*

[www.britannica.com/topic/dairy-product#/media/1/149947/191967](http://www.britannica.com/topic/dairy-product#/media/1/149947/191967). Accessed 28 Jan. 2023.

Milk is a very commonly pasteurized product which is why we decided to get this image. We found this on a secondary source, but it is a primary image.

*Milk Bottle Cap. Brown's Dairy. Placerville, CA. Pinterest,*

[www.pinterest.com/pin/milk-bottle-cap-browns-dairy-placerville-ca--545639311116093244/](http://www.pinterest.com/pin/milk-bottle-cap-browns-dairy-placerville-ca--545639311116093244/). Accessed 12 May 2023.

This is an image of a raw milk bottle cap from Brown's Dairy in Placerville, California. When testing pasteurization in New York, they had a group of babies drink raw milk and another group drink pasteurized milk. We will use this image when referring to the milk used in those tests.

"Napoleon III." *Encyclopedia Britannica,*

[www.britannica.com/biography/Napoleon-III-emperor-of-France#/media/1/403129/13168](http://www.britannica.com/biography/Napoleon-III-emperor-of-France#/media/1/403129/13168). Accessed 2 Feb. 2023.

Napoleon Bonaparte III was the person who commissioned Louis Pasteur to create pasteurization to save the French wine industry. We found this picture on a secondary source, but it's a primary image.

"Napoleon on the Battlefield at Eylau, February 1807." *Encyclopedia Britannica*,  
[www.britannica.com/biography/Napoleon-I/War-with-Britain#/media/1/402943/111776](http://www.britannica.com/biography/Napoleon-I/War-with-Britain#/media/1/402943/111776).  
 Accessed 28 Jan. 2023.

Louis Pasteur asked the French military for assistance a few times to help him with some tests he ran on boats which is why included this image of the French military in our documentary. We found this picture on a secondary source, but it is a primary image.

Nathan Straus' First Milk Depot, opened in the summer of 1893. (Courtesy of the Augustus C. Long Health Sciences Library, Columbia University). *Vintage Everyday*, 9 Oct. 2017, [www.vintag.es/2017/10/nathan-straus-and-milk-stations-that.html](http://www.vintag.es/2017/10/nathan-straus-and-milk-stations-that.html). Accessed 28 Jan. 2023.

We found three pictures of Nathan Straus' Milk Depots. He opened them so that he could provide safe milk to babies and the poor. We will use these when talking about Nathan Straus. We found those pictures on a secondary source, but they're primary images.

*New York City in the Year 1900*. 2018. *YouTube*, [youtu.be/QlBinV6pFM8](https://youtu.be/QlBinV6pFM8). Accessed 6 Jan. 2023.

This video is New York in 1900. We will use this video when referencing when pasteurization came to America.

1900's Baby Posing for Picture. *Moms Who Think*, Moms Who Think Staff, 21 Feb. 2021, [www.momswhothink.com/top-100-baby-names-for-the-1900s/](http://www.momswhothink.com/top-100-baby-names-for-the-1900s/). Accessed 29 Mar. 2023.

We needed a pictures of babies from the 1900's and I think that this one fit the mold well. It's very clear and you can clearly see that it is a baby. I found this image on a secondary source but it's a primary image.

"Orange Juice." *Encyclopedia Britannica*,

[www.britannica.com/topic/fruit-processing/Packaging#/media/1/221114/254325](http://www.britannica.com/topic/fruit-processing/Packaging#/media/1/221114/254325).

Accessed 29 Jan. 2023.

Fruit juices are a product that can use pasteurization and this is a picture of three cups of orange juice in a factory. We found this on a secondary source, but it is a primary image.

"Pandemic Exposes Scientific Rift Over Proving When Germs are Airborne." *Express Pharma*,

Reuters, 12 July 2020,

[www.expresspharma.in/pandemic-exposes-scientific-rift-over-proving-when-germs-are-airborne/](http://www.expresspharma.in/pandemic-exposes-scientific-rift-over-proving-when-germs-are-airborne/). Accessed 29 Jan. 2023.

We found a good picture of germs in the air. We needed that picture because in our iMovie we talk about how germs would fall into wine causing the wine to sour. We found this on a secondary source, but it is a primary image.

"Pasteurization of Milk." *Encyclopedia Britannica*,

[www.britannica.com/technology/pasteurization#/media/1/446003/254630](http://www.britannica.com/technology/pasteurization#/media/1/446003/254630). Accessed 23 Jan. 2023.

High temperature short time pasteurization is the most common type of pasteurization in the U.S. Products that use high temperature short time pasteurization are milk, dairy products, juices, and canned foods. We found this on a secondary source, but it is a primary image.

"Place a Digital Thermometer Through the Foil and Inside One of the Bottles." *Wiki How*, 30

Apr. 2016, [www.wikihow.com/Pasteurize-Your-Homemade-Wine](http://www.wikihow.com/Pasteurize-Your-Homemade-Wine). Accessed 2 Feb. 2023.

When wine is pasteurized, it gets heated up to a very high temperature which is why we chose a picture of wine being heated. We found this on a secondary source, but it is a primary image.

*Raw Milk. UtahNaturalMeat*, 22 Mar. 2021,

[www.utahnaturalmeat.com/farm-thoughts/3-reasons-to-drink-raw-milk-amp-1-reason-not-to](http://www.utahnaturalmeat.com/farm-thoughts/3-reasons-to-drink-raw-milk-amp-1-reason-not-to). Accessed 2 Feb. 2023.

People thought that raw milk was more nutritious than pasteurized milk. That is why we chose this image to include in our documentary. We found this on a secondary source, but it is a primary image.

Schwarz, Joe. "Beets." *McGill*, 6 Mar. 2019,

[www.mcgill.ca/oss/article/health-nutrition/how-louis-pasteur-beat-beet-problem-and-changed-medicine-forever](http://www.mcgill.ca/oss/article/health-nutrition/how-louis-pasteur-beat-beet-problem-and-changed-medicine-forever). Accessed 28 Jan. 2023.

We got a picture of beets because we were referring to beetroot alcohol. We found this on a secondary source, but it is a primary image.

Shoup, Mary Ellen. "Merchandising Fresh Produce: Shoppers Seek More Snack-Sized and Local Options." 27 Mar. 2019. *Food Navigator-USA.Com*, Mary Ellen Shoup, 27 Mar. 2019,

[www.foodnavigator-usa.com/Article/2019/03/27/Merchandising-fresh-produce-Shoppers-look-for-more-snack-sized-and-local-options#](http://www.foodnavigator-usa.com/Article/2019/03/27/Merchandising-fresh-produce-Shoppers-look-for-more-snack-sized-and-local-options#). Accessed 29 Jan. 2023.

Nicholas Appert used heat to preserve produce. That is why we got a picture of produce. We found this on a secondary source, but it is a primary image.

Sixteen Signs in Times Square Were Turned Out by One Small Switch Operated by Douglas

Leigh, Sign Designer, in New York, March 1, 1942. 1 Mar. 1942. *My Modern Met*,

Jessica Stewart, 4 May 2017, [mymodernmet.com/daily-life-new-york-1940s/](http://mymodernmet.com/daily-life-new-york-1940s/). Accessed 2 Feb. 2023.

This is a picture of Times Square in the 1940's. We talk about how pasteurization was made law in the 1940's so we will use this picture to represent the 1940's. We found this picture on a secondary source, but it's a primary image.

"State Capitol, Lansing, Michigan." *Encyclopedia Britannica*,

[www.britannica.com/place/Lansing-Michigan#/media/1/330008/29783](http://www.britannica.com/place/Lansing-Michigan#/media/1/330008/29783). Accessed 27 Jan. 2023.

This is a picture of the Michigan State Capitol, located in Lansing. We used this picture because Michigan passed a statewide mandatory pasteurization law in 1947. We found this on a secondary source, but it is a primary image.

*Straus in 1922*. *Wikipedia*, [en.wikipedia.org/wiki/Nathan\\_Straus](https://en.wikipedia.org/wiki/Nathan_Straus). Accessed 2 Feb. 2023.

We will use this picture of an elderly Nathan Straus when we talk about how he was an advocate for pasteurization. We found this picture on a secondary source, but it's a primary image.

"United States." *Encyclopedia Britannica*,

[www.britannica.com/place/United-States#/media/1/616563/208185](http://www.britannica.com/place/United-States#/media/1/616563/208185). Accessed 28 Jan. 2023.

Pasteurization eventually came to America after being created. We will use this image to show how pasteurization came to America. We found this on a secondary source, but it is a primary image.

"U.S Capitol Building, Washington D.C." *Encyclopedia Britannica*,

[www.britannica.com/summary/Washington-DC#/media/1/636322/148802](http://www.britannica.com/summary/Washington-DC#/media/1/636322/148802). Accessed 28 Jan. 2023.

This is a picture of our nation's Capitol, located in Washington D.C. Nathan Straus stated that if they made pasteurization a law, he would donate a milk plant to D.C. which is why we have this image. We found this on a secondary source, but it is a primary image.

A Variety of Dairy Products. *Harvard Health Publishing*, Harvard Health Blog, 25 Jan. 2019,

[www.health.harvard.edu/blog/dairy-health-food-or-health-risk-2019012515849](http://www.health.harvard.edu/blog/dairy-health-food-or-health-risk-2019012515849). Accessed 29 Jan. 2023.

Dairy products are one thing that uses pasteurization. We found a picture of dairy products, including cheese, yogurt, milk, and butter.

"Wine." *Encyclopedia Britannica*,

[www.britannica.com/topic/alcoholic-beverage#/media/1/13435/253766](http://www.britannica.com/topic/alcoholic-beverage#/media/1/13435/253766). Accessed 28 Jan. 2023.

This is a picture of three cups of different types of wine. We will use this when we talk about how wine is a pasteurized product. We found this on a secondary source, but it is a primary image.

"Wine Aging." *Encyclopedia Britannica*,

[www.britannica.com/topic/wine/Aging-and-bottling#/media/1/645269/231808](http://www.britannica.com/topic/wine/Aging-and-bottling#/media/1/645269/231808). Accessed 29 Jan. 2023.

After pasteurization was created, Louis Pasteur ran some tests to make sure that the process was effective. He put kegs of wine on a ship to test it out. We will use

these kegs of wine to symbolize the kegs of wine that Pasteur put on the ship. We found this on a secondary source, but it is a primary image.

"Yeast." *Encyclopedia Britannica*,

[www.britannica.com/science/yeast-fungus#/media/1/652395/203798](http://www.britannica.com/science/yeast-fungus#/media/1/652395/203798). Accessed 28 Jan. 2023.

Yeast is a big ingredient in beer and wine. This is a close up picture of some yeast cells. We found this on a secondary source, but it is a primary image.

"Yogurt." *Encyclopedia Britannica*, [www.britannica.com/topic/yogurt#/media/1/653449/254214](http://www.britannica.com/topic/yogurt#/media/1/653449/254214). Accessed 28 Jan. 2023.

Yogurt is a dairy product that uses pasteurization. We will use this picture of yogurt when we talk about the products that use pasteurization. We found this on a secondary source, but it is a primary image.

## **Web sites, e-sources**

Britannica, The Editors of Encyclopaedia. "Nicolas Appert." *Encyclopedia Britannica*, 30 May. 2022, <https://www.britannica.com/biography/Nicolas-Appert>. Accessed 13 January 2023.

This was a useful website about Nicolas Appert. He was one of the first people to use heating methods to preserve dairy products and produce. He did this by boiling jars with the products inside. We also found a good picture of Nicolas Appert in this source. We found that image on a secondary source, but it is a primary image.

Centers for Disease Control and Prevention. "Raw Milk Questions and Answers." *Centers for Disease Control and Prevention*, 28 Jan. 2022,

[www.cdc.gov/foodsafety/rawmilk/raw-milk-questions-and-answers.html](http://www.cdc.gov/foodsafety/rawmilk/raw-milk-questions-and-answers.html). Accessed 10 Nov. 2022.

We used this site because it described how lots of people were dying from diseases from non-pasteurized milk. After pasteurization was made law, lots of people stopped dying from diseases in milk.

Famous-scientist.blogspot.com. "Franz Von Soxhlet (1848-1926)."

*Famous-scientists.blogspot.com*, Blogspot.com, 9 Dec. 2020,

[www.google.com/url?sa=i&url=https%3A%2F%2Ffamous-scientist.blogspot.com%2F2020%2F12%2Ffranz-von-soxhlet-18481926.html&psig=AOvVaw0ssirc3HtjZlDnbltAxPVX&ust=1672946586748000&source=images&cd=vfe&ved=2ahUKEwjPx8Lp0a78AhX7LN4AHaGgCx4Qr4kDegQIARA\\_](https://www.google.com/url?sa=i&url=https%3A%2F%2Ffamous-scientist.blogspot.com%2F2020%2F12%2Ffranz-von-soxhlet-18481926.html&psig=AOvVaw0ssirc3HtjZlDnbltAxPVX&ust=1672946586748000&source=images&cd=vfe&ved=2ahUKEwjPx8Lp0a78AhX7LN4AHaGgCx4Qr4kDegQIARA_). Accessed 6 Jan. 2023.

This website was helpful because it talked about Franz Von Soxhlet. Soxhlet was the first person to suggest that pasteurized products should be sold to the public.

We also found a good picture of Franz Von Soxhlet on this site.

Fernandez, Daniel. "The Surprisingly Intolerant History of Milk." *Smithsonian Magazine*, 11 May 2018,

[www.smithsonianmag.com/history/surprisingly-intolerant-history-milk-180969056/](http://www.smithsonianmag.com/history/surprisingly-intolerant-history-milk-180969056/).

Accessed 3 May 2023.

We had never really heard of swill milk until we found this website. The site told us about how companies were making their milk look white even though it wasn't.

The companies would then market the milk as pure country milk which caused many people to buy the milk and many people to get sick from drinking it. We also found a useful picture that we will use as well.

*Find a Grave*. [www.findagrave.com/memorial/149109288/ernst-joseph-lederle](http://www.findagrave.com/memorial/149109288/ernst-joseph-lederle). Accessed 27 Jan. 2023.

Ernst Lederle was the president of the New York City Board of Health. This site also gives us his birthday and the day of his death. We will also be using the picture that is featured on the site.

Fortier, Kevin. "Pasteurization: Louis Pasteur's Gift To The Beverage Industry." *Bevco Sales Int.*, Orlando Design Company, [bevco.net/blogs/bevco-conveyors-and-equipment-for-food-amp-beverage/pasteurization-louis-pasteur-s-gift-to-the-beverage-industry](http://bevco.net/blogs/bevco-conveyors-and-equipment-for-food-amp-beverage/pasteurization-louis-pasteur-s-gift-to-the-beverage-industry). Accessed 8 Nov. 2022.

The original process of pasteurization is very different from the process today. This website gives us some good information on the original procedure. It also told us why Pasteur decided to create the process.

International Dairy Foods Association, editor. "Pasteurization." *International Dairy Foods Association*, [www.idfa.org/pasteurization](http://www.idfa.org/pasteurization). Accessed 7 Nov. 2022.

We used this site for a piece of information that was talking about how vat pasteurization was the original method of pasteurization. It also talked about how dairy industries use vat pasteurization; now mainly used for cheese, yogurt, and for some ice cream mixes.

Kovarik, Bill. "Dr. North and the Kansas City Milk War." *Environmental History*, WordPress, [environmentalhistory.org/people/dr-north-and-the-kansas-city-milk-war/](http://environmentalhistory.org/people/dr-north-and-the-kansas-city-milk-war/). Accessed 3 May 2023.

Dr. Charles E. North was a strong advocate for pasteurization in Kansas City. He was a big part in New York's pasteurization laws and led commissions that made rules for milk testing and being sanitary with milk. This article was very useful!

Riley, Thomas. "The Evolution and Revolution of Pasteurization." *MarketScale*, [marketscale.com/industries/food-and-beverage/the-evolution-and-revolution-of-pasteurization/](https://marketscale.com/industries/food-and-beverage/the-evolution-and-revolution-of-pasteurization/). Accessed 8 Nov. 2022.

The process of pasteurization has evolved and this website told us a lot about that. It also told us about how the Chinese's form of pasteurization is pretty similar to the one we use today.

Schwarcz, Joe, editor. "Who First Suggested That Milk Be Pasteurized to Make It Safer for Consumption." *Mcgill.ca*, Joe Schwarcz, 20 Mar. 2017, [www.mcgill.ca/oss/article/history-science-science-everywhere-you-asked/who-first-suggested-milk-be-pasteurized-make-it-safer-consumption](http://www.mcgill.ca/oss/article/history-science-science-everywhere-you-asked/who-first-suggested-milk-be-pasteurized-make-it-safer-consumption). Accessed 3 Jan. 2023.

We used this website because it told us about some useful information about how a German agricultural chemist, named Frans von Soxhlet, was the first person to suggest that milk should be sold to the public pasteurized. It also talked about how Pasteur didn't really invent pasteurization because the fact that heat made foods safer was discovered long before Louis Pasteur. Pasteur was the first one to explain how it worked.